

RAP

ON-GOING ETS-RELATED RESEARCH

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The Tobacco Institute Information Center

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The Surgeon General has determined that "involuntary smoking is a cause of disease, including lung cancer, among healthy non-smokers." Koop's 1986 report, The Health Consequences of Involuntary Smoking, may be regarded by elements of the anti-smoking movement as the definitive work on the alleged health effects of environmental tobacco smoke (ETS). However, the real significance of the report may be that in his prohibitionist zeal, Koop based his unequivocal conclusion on a pool of questionable data.

Another report often cited in the passive smoking debate is the National Research Council (NRC) of the National Academy of Sciences (NAS) 1986 report Environmental Tobacco Smoke: Measuring the Exposures and Assessing Health Effects. Members of the NRC Committee on Passive Smoking based their analysis of the health risks of ETS on 13 studies from the United States and abroad. A list of these studies is attached at tab A.

There is considerable debate concerning the amount of reliable data available on the health effects of, and the methods employed to assess the level of exposure to, ETS. Both the Surgeon General and NRC reports identify areas in need of study and offer several recommendations. Each report may serve as a guide for the ambitious researcher or institution interested in obtaining funding for such endeavors.

This report is a brief overview of on-going ETS-related research projects in the United States and abroad. Compiled from government directories and other reliable sources, the accompanying charts represent the bulk of scientific and sociological ETS-related research currently underway. An analysis is based on the limited, available information; it is not intended to be a scientific review of methodology, credibility or study results.

Two government publications identify recent ETS-related research: the Public Health Service (PHS) Directory of On-Going Research 1984-85 (1985), and the Office on Smoking and Health (OSH), Biennial Report to Congress (1986). Both contain abstracts, supplied by the study investigator, describing the focus of the research as well as the source of funding, investigators and date of project. The PHS and OSH guides are scheduled to be updated next year.

The two accompanying indexes of ETS-related research list 54 national and 38 international ETS-related studies. These

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indexes are organized in chronological order by the end-date of each study. The information includes: the time period of the study, title, primary investigator(s), institution or organization, source of funding and comments on the progress or preliminary results of the investigation. The index of U.S.-based research is attached at tab B; international studies can be found at tab C.

Due to limited access to more specific information, it is virtually impossible to to assess the credibility of the investigators, their methods or their study results to date.

It seems that few, if any, of the studies have been published. Also, it is difficult to determine when or how the research results will be made public. Since it is often several years before an investigator's work appears in a professional journal, it is possible that results of the identified studies may not yet be published.

It is not surprising that the major source of funding for ETS-related research in the U.S. is the National Cancer Institute (NCI). NCI funds 16 of the U.S. passive smoking studies. Other Department of Health and Human Services grantors are: Public Health Service (one study), National Institutes of Health (three studies), National Heart Lung and Blood Institute (five studies), National Institute of Environmental Health Sciences (three studies) and National Institute of Allergy and Infectious Diseases (one study). The Veterans Administration and the Environmental Protection Agency also sponsor ETS-related projects.

Interestingly, certain institutions involved in ETS-related research also participate in NCI anti-tobacco activities. They include two participants in NCI's "heavy smokers" community intervention trial: the American Health Foundation, New York, and the Kaiser Foundation Research Institute, Oakland, California.

Private-sector organizations provide the financial support for several projects, e.g., American Lung Association, Health Effects Institute, Cystic Fibrosis Foundation. The funding is often in conjunction with government grants. Universities which figure prominently in ETS-related research are: University of Arizona, University of New Mexico and University of Arkansas.

It appears that several investigators rely on questionable assumptions before undertaking their studies. For

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example, researchers studying heart and chronic diseases at the University of California, San Diego, indicated that passive smoking "increases the risk for coronary heart disease." In another PHS investigator-supplied abstract, the researcher identifies cigarette smoke as a major cause of lung cancer among non-smokers. These assumptions may have been presented to the grantors in an effort to curry favor and increase the likelihood of securing funding. Moreover, these judgments diminish the probability of the investigators rendering objective results.

Based on the abstracts of the apparently concluded studies, not all of the studies produce evidence indicating increased health risks from passive smoking. For example, Lebowitz's eight year study on "Environmental Factors in Obstructive Airway Diseases" found that, although passive smoking may affect children's respiratory responses, it did not affect those of adults. No correlation between sidestream smoke exposure and bladder cancer was found by a research team headed by Ernst Wynder at the American Health Foundation.

Although some of the research spans two decades, the majority of ETS-related research has been conducted in the 1980s, following Hirayama's investigation of nonsmoking wives of smoking husbands in Japan. This study and Trichopoulos' efforts in Greece are frequently cited as landmark studies.

Not surprisingly, the focus of many studies is the investigation of the effects of ETS on infants and children, and on nonsmoking adults, i.e., spouses. Some investigators pursue the work on children further, examining the effects of passive smoking in utero and during the first few days of life. The NHLBI-sponsored University of North Carolina "Intervention Program to Reduce Passive Smoking Among Infants" is one such project.

Research underway concerning workplace smoking examines the sociological and psychological reactions of nonsmokers to smoking colleagues and workplace smoking policies. However, a New York State Department of Health study, "Epidemiology of Lung Cancer in Nonsmokers," focused on passive smoking and occupation as factors in lung cancer.

The PHS directory indicates that J.H. Stebbings at the University of Chicago recently concluded an NCI-sponsored investigation of the synergistic effect of radon and ETS. The researchers explored exposures in the home, comparing smokers and nonsmokers.

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In addition to the study of sidestream smoke and its alleged effects on health, additives found in cigarettes are also under review. The American Health Foundation is studying low-tar, low-nicotine cigarettes for content. According to the abstract of the AHF study, this project will provide the base for future research on particulate matter.

Specific populations are the focus of several studies, e.g., the Amish in Pennsylvania and Hispanics in the southwest U.S. The influence of ethnic and cultural factors on smoke exposure to ETS is under study as well. For example: Miller of Studies on Smoking, Edinboro, PA, believes the low cancer rate among the Amish may be due to the smoke-free environment; and Jonathan Samet, the University of New Mexico, is assessing ETS exposures in New Mexico's Hispanics.

The NRC 1986 ETS report is included among the items listed on the national index to serve as a bench mark for studies conducted after the report's release. Twenty-seven studies are scheduled to conclude after November 1986, with the possibility of published results on the horizon.

Several of the research efforts with post-NRC end-dates are the work of the American Health Foundation (AHF). AHF's Dietrich Hoffman is developing methods to analyze saliva, and "ETS pollutants," sidestream smoke, and particulate absorption. A New York State Department of Health study, scheduled to conclude 9/86, studied urine cotinine levels in nonsmokers; the results will serve as a base to develop "more accurate" ETS measures.

Generally, research conducted by scientists abroad is similar to that pursued in the U.S., i.e., risk factors of passive smoking, assessing ETS exposure levels among children and nonsmoking adults, and exploring methods to detect exposure to ETS. ETS-related research is underway in: Australia, Austria, Canada, Finland, France, Greece, Hong Kong, Israel, Japan, Poland, Portugal, Sweden and the United Kingdom.

Trichopoulos' 1984 study is included on the index of international studies as a reference point against which the progression of research abroad can be measured. Interestingly, NCI provided funding for Trichopoulos' 1978-1984 "Lung Cancer and Passive Smoking" project, one of the NRC's 13 "credible" studies. Currently, the Harvard School of Public Health is working with Trichopoulos and the University of Athens on a two-year study of "passive smoking, air pollution and diet in the etiology of lung

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cancer." The Harvard-Athens project is scheduled to conclude December, 1987.

The index of international research reflects 12 studies with completion dates after NRC published its 1986 ETS report. Several of these studies pertain to the assessment of health risks. In the area of methodology, Matsushita, Kyoto University, Japan, is developing a test to measure nitrosamines. Gillis' work at the West Scotland Cancer Surveillance Unit continues with future plans to develop methods to quantify ETS exposure.

In addition to ETS "science," Stanton Glantz, University of California, San Francisco, has compiled the Bibliography on Passive Smoking, which identifies most, if not all, of the published articles concerning involuntary smoking. The 75-page bibliography lists several hundred U.S. and foreign articles, dating from 1923. The majority of the articles, however, were published in the 1970s and 1980s. For your reference, a copy of Glantz's bibliography is on file in the Information Center.

Although this report does not identify every ETS-related study underway in the U.S. and overseas, the information presented offers an overview of the key players and government interests. Identifying the thrust of on-going research may serve as a useful indication of future efforts.

Broad questions remain: Have accurate methods of assessing exposure been, or are they being, developed? If not, can the studies produce reliable data and objective results? However, it is likely that anti-smoking advocates will use the results of this research to further their social agenda and attempt to influence public policy.

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TABLE 12-3 Epidemiologic Studies of Lung Cancer and Exposure to Environmental Tobacco Smoke: Methodological Description of Studies Included in Analysis

Study	Subjects	Exposure Assessment ^a				Environments Assessed	Comments
		Type of Interview	Proxy Informants?	Not Married	Exsmokers ^b		
Chan and Fung, 1982	Hong Kong, <39: 84 cases (out of 189); 139 orthopedic controls	Interview, not blind	No criteria given	No criteria given	No criteria given	Home and workplace	Little information on methods or selection of controls; no adjustments of odds ratio; high cancer rate for South China
Trichopoulos, et al., 1983	Greece: 62 cases (out of 102); 190 orthopedic controls (out of 251)	Interview, not blind	No	"Unexposed"	Exclude if smoked within prior 20 yr; "nonsmoker" if no smoking in 20 yr; "ex-smoker" if stopped 5-20 yr before	Spouse (current and former)	Excluded adenocarcinomas and terminal bronchial; original sample similar age and SES, no match on final sample
Correa et al., 1983	Louisiana: 30 (22F, 8M) cases (out of 35) 313 (133F, 180M) hospital controls (diseases not related to smoking)	Interview, blinded	Yes (24% of cases, 11% of controls)	Excluded, include "ever married"	Exclude; used pack yr of husband	Spouse, parents	No adjustment for age, race, or hospital admission; reported odds ratio for older than 40; excluded bronchioalveolar cancer
Kabat and Wynder, 1984	Multicenter USA: 78 (25M, 53F) cases; 78 (25M, 53F) controls (non-tobacco cancers)	Interview, not blind	No	24 cases and 25 controls had no spouse	Only data for 1 yr	Workplace, home	Cases, controls matched for age, sex, race, hospital, and date interviewed
Buffler et al., 1984	Texas: 41 cases (out of 460); 192 population-based controls (out of 482)	Interview	Yes	No criteria given	No criteria given	Spouse	Original population matched age, race, vital status, county; no match on final sample
Garfinkel et al., 1985	NJ, Ohio: 134 cases age 40+; 402 colon cancer	Interview, blinded	Yes	Used data on relative, otherwise "unexposed"	Exclude, exposed	Home, outside home	No dose-response effect; corrected for age, SES, date diagnosed
Pershagen et al., in press	Sweden: 67 registry cases; 347 controls	Mailed	Yes	"Unexposed"	Exclude	Spouse, parents, workplace	Previous interview -1961, 1963 with follow-up 1984; possible interaction with radon; adjusted for occupation, radon, urban; matched for age, vital status
Akiba et al., 1986	Japan: 113 (94F, 19M) cases (out of 164); 380 (270F, 110M) controls (match age, city, vital status)	Interview, not blind	Yes, (90% of cases, 88% of controls)	Excluded	Exclude; spouse "nonsmoker" if no smoking in prior 10 yr	Spouse, parents	Selected from atomic bomb survivors; average age more than 70; no adjustment for radiation dose

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TABLE 12-3 Continued

Study	Subjects	Exposure Assessment ^a					Comments
		Type of Interview	Proxy Informants?	Not Married	Exsmokers ^b	Environments Assessed	
Koo et al., in press	Hong Kong: 86 cases (out of 200); 136 controls (out of 200)	Interview, not blind	No	Used work-place	Exclude; exposed	Workplace, home, parents	Original sample matched for age, SES; no data on match in final sample; data on former spouses
Lee et al., 1986	England: 47 (32F, 15M) cases (out of 1,863); 96 (66F, 30M) controls	Interview	No	Excluded	Exclude	Home, work-place, leisure, daily travel	Follow-up; original sample matched for age, sex; not matched in final sample
Garfinkel et al., 1981	USA survey: 375,000 women (176,739 married) (total 153 cases)	Mailed	Yes	Used relative	Exclude	Spouse	Interviewed 1959, 1960 followed up 1972; adjusted for age, race, education, occupation, disease
Gillis et al., 1984	Scotland: 4,061 married pairs (total 6 cases)	Interview self-report	No	Excluded	Exclude	Spouse	Survey 1972, 1976 with mortality through 1982; age adjusted
Hirayama, 1981, 1984	Japan: 142,857 women age 40+ (91,450 married) (total 200 cases by death certificates)	Interview, blinded	No	Excluded	Exclude; calculated risk separately	Spouse (current)	Interviewed, follow-up 16 yr later; differences in age, occupation

^aThese columns include the criteria for certain aspects of exposure assessment treated in the data analyses of the study.

^bDisposition if subject is exsmoker; disposition if husband is exsmoker.

Source: National Research Council, Environmental Tobacco Smoke Measuring Exposures and Assessing Health Effects, 228-30, 1986.

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INDEX OF
ETS-RELATED STUDIES*

— National —

<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
4/81-12/82	Case-Control Study of Carcinoma of the Lung in Women.	Henderson, B.E., Pike, M.C., Wu, A.H.	University of Southern California, Los Angeles, CA	ACS	Study investigating passive smoking. Follow-up to "investigate the risk factors suggested."
1972-1983	Effects of Oxidants on Production of Lung Lesions.	Freeman, G.	SRI International, Menlo Park, CA	EPA	As of 1985, results suggest evidence of pulmonary disease in nonsmokers, especially children.
1975-1983	Environmental Tobacco Smoke Respiratory Disease.	Salvaggio, J., Lehrer, S.	Tulane University, New Orleans, LA	NIAID	Published? Individuals tested for allergic reactions to tobacco smoke.

* Studies are presented in chronological order, by project end-date.

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<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
9/80-4/84	Passive Smoking, Respiratory Symptoms, Lung Function and Initiation of Smoking in Tecumseh, Michigan (Doctoral Dissertation).	Burchfiel, C.M., Higgins, M.W., Higgins, I.T.T., et al.	University of Michigan, Ann Arbor, MI	University of Michigan	Fifteen year study of 0-19 year olds, assessing passive exposure to household cigarette smoke.
7/82-6/84	Effect of Passive Exposure to Cigarette Smoke on Membrane Glycoprotein Biosynthesis.	Hunt, L.A.	University of Louisville, Louisville, KY	KTHRI	Studying effect of side stream smoke exposure on protein synthesis. Future study will fractionate gas and particulate phase of smoke.
3/84-6/84	Passive Smoking: Myth or Reality?	Frost, F., Hafer, R.F.	Washington Department of Social and Health Services/Epidemiology, Seattle, WA	WSDSHS/E	Published 1984 Morbidity Report. Hopes to publish as public education piece, with wide distribution.
7/81-7/84	Cancer Risk From Transplacental and Passive Exposure to Cigarette Smoke.	Sandler, D.P., Everson, R.B., Wilcox, A.J.	National Institute of Environmental and Health Sciences, Research Triangle Park, NC	NIEHS	Study complete; "methods evaluated will be applied in future studies to specific cancer sites."
12/76-1984	Environmental Factors in Obstructive Airway Diseases.	Lebowitz, M.D.	University of Arizona, Tuscon, AZ	EPA; NHLBI; EPRI	Smoking termed major factor in airway diseases. Passive smoking may effect children's responses, but not adults.

<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
7/82-5/85	The Effects of Renal Function on Nicotine Metabolism.	Trebbin, W.M., Perry, R.J.	Roger Williams General Hospital, Brown University Program in Medicine, Providence, RI	CTR	Assess nicotine and cotinine levels in smokers and non-smokers. Future study of passive smoke exposure.
5/84-5/85	Acute Effects of Carbon Monoxide in Individuals With Coronary Artery Disease: A Multi-Center Study.	Hackney, J.D., Selvester, R.H., Linn, W.S.	Ranchos Los Amigos Medical Center, Downey, CA	Health Effects Institute, Cambridge, MA	Study assessing health effects of CO and ambient air.
7/81-6/85	Environmental Metallic Ions and Immune Processes.	Vredevoe, D.L., Levy, L.	University of California, School of Nursing, Los Angeles, CA	NIEHS	Cadium in tobacco products may be hazardous for the smoker and nonsmoker. More work in this area will be done.
6/82-6/85	Studies in Tobacco-Related Cancers.	Wynder, E.L., Goodman, M.T., Kabat, G.C., et al.	American Health Foundation, New York, NY	NCI	No association found between bladder cancer and sidestream smoke exposure.
6/83-6/85	Study of Passive Smoking and Acute Middle Ear Effusions in Infants.	Etzel, R.A., Greenberg, R.A., Henderson, F.W., et al.	University of North Carolina at Chapel Hill, Chapel Hill, NC	Robert Wood Johnson Foundation	"Analyses of sera for cotinine were completed in 1985." Published?

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<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
4/85-6/85	Survey of Attitudes About Passive Smoking.	Ruehlman, P.	Group Health Associates, Cincinnati, OH	Group Health Associates	Survey of workplace smoking, complaints and opinions about legislation.
6/83-9/85	Indoor Air Quality and Energy Efficiency.	Morrill, J.H.	American Council for an Energy-Efficient Economy, Washington, DC	MacArthur Foundation	Identifying sources and health effects. ETS is a major concern.
7/80-10/85	Synergistic Interactions of Indoor Radon Progeny and Cigarette Smoke.	Martell, E.A.	National Center for Atmospheric Research, Boulder, CO	NCAR	"Multistage cascade impactors and low level β -counting" methods to determine distributions.
12/84-11/85	Epidemiology of Lung Cancer in Nonsmokers.	Janerich, D.T.	New York State Department of Health, Albany, New York	NCI	Studying passive smoking and occupation as factors in non-smokers' lung cancer.
6/84-12/85	SMOKEBUSTERS: A One Hour Documentary Film on the Effects of Ambient Tobacco Smoke on Nonsmokers and the Impact of Nonsmokers' Rights Groups on the Legislative Process.	Leichtman, A.P.	Amberly Associates, Cincinnati, OH	Amberly Associates	CATS president's film on passive smoking.

<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
9/85-8/86	Passive Smoking as a Cervical Cancer Risk Factor.	West, D.W.	University of Utah, Salt Lake City, UT	NCI	Study involves 1,155 subjects. Blood samples used for sera cotinine analysis and to verify smoking history data.
1/84-1/86	Effect of Smoking and Air Pollution on Asthma and Airway Function in Los Angeles School Children.	Kilburn, K.H., Warshaw, R., Thornton, J.C.	University of Southern California, Los Angeles, CA	NCI	CO used to reflect level of home smoking exposure. Ethnic differences suggested. Further analyses of data is planned.
10/83-7/86	Biological Monitoring of Human Sensitivity to Diesel Exhaust Exposure.	Schenker, M.B.	University of California, Davis, Davis, CA	Health Effects Institute, Cambridge, MA	Urine samples tested for exposure to passive smoke (mutagenicity).
7/84-7/86	Quantitative Measurement of Deposition of Diesel Exhaust Particulates in the Human Respiratory Tract (Particle Size Analysis of Cigarette Smoke Particulates).	Hiller, F.C., Anderson, P.J.	University of Arkansas for Medical Sciences, Little Rock, AR	NIH; EPA; ALA	Description of methods used and results of study not available. Results being prepared for publication.

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<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
9/83-8/86	Experimental Tobacco Carcinogenesis. A Program Project.	Hoffmann, D.	American Health Foundation, Naylor Dana Institute, Valhalla, NY	NCI	"Significant endogenous nitrosation occurs in smokers and snuff dippers, while there was no measurable nitrosation potential for environmental smoke under experimental conditions."
9/83-8/86	Endogenous Formation of Nicotine-Derived N-Nirosamines.	Hoffmann, D., Castonguay, A.	American Health Foundation, Naylor Dana Institute, Valhalla, NY	NCI	Risk assessment of aromatic amines and passive smoke.
9/85-8/86	Lung Cancer in Nonsmoking Women.	Correa, P.	Louisiana State Medical Center, New Orleans, LA	NCI	Surveying women in Atlanta, Houston, Los Angeles, New Orleans and San Francisco.
9/85-8/86	Dose Interactions of Passive Smoking with Domestic Radon.	Stebbing, J.H.	University of Chicago, Chicago, IL	NCI	Quantifying exposure to passive smoke and retention of radon daughters under "normal domestic exposures." Study to compare smokers and nonsmokers.
7/85-9/86	Assessment of Health Risks of Passive Exposure to Tobacco Smoke.	Davis, D.L., Wagener, D.	National Academy of Sciences, National Research Council, Washington, DC	PHS; EPA; OSH	NAS NRC report published fall 1986.

<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
9/85-9/86	Measurement of Self-Reported Exposure to Passive Smoke.	Cummings, K.M.	New York State Department of Health, Albany, NY	NCI	Nonsmokers self-report measures verified by testing urine cotinine levels. Findings will be used to develop "more accurate" ETS measures.
6/84-5/87	Experimental Tobacco Carcinogenesis: Sidestream Smoke Carcinogenicity.	Hoffmann, D., Haley, N.J.	American Health Foundation, Naylor Dana Institute, Valhalla, NY	NCI	Evaluating sidestream smoke absorption.
6/84-5/87	Experimental Tobacco Carcinogenesis: Analytical Studies in Tobacco Carcinogenesis.	Hoffmann, D., Brunnemann, K.D.	American Health Foundation, Naylor Dana Institute, Valhalla, NY	NCI	Developing sensitive methods for detecting amides (and N-nitro-analogues) in tobacco, tobacco smoke and smokers saliva. Also analyzing environmental smoke pollutants.
6/81-6/87	Tobacco Flavor Compounds: Analysis, Mutagenicity and Carcinogenicity.	Hoffmann, D., LaVoie, E.J.	American Health Foundation, Naylor Dana Institute, Valhalla, NY	NCI	Monitoring low-tar, low-nicotine cigarettes for additives. Will conduct analysis of particulates.
10/84-10/88	Particulate Matter, Ozone, Indoor Pollutants and Respiratory Diseases.	Lebowitz, M.	University of Arizona Health Sciences Center, Tuscon, AZ	EPA	Assessing respiratory effects in children. Extensive monitoring of indoor and outdoor air.

<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
6/71-6/88	Rancho Bernardo Heart and Chronic Disease Survey.	Barrett-Connor, E., Wingard, D.	University of California, San Diego La Jolla, CA	NHLBI	Researchers premise: passive smoking "increases risk for coronary heart disease."
2/84-1988	Acute Cigarette Smoke Exposure Increases Alveolar Permeability in Rabbits.	Witten, M., Lemen, R., Quan, S., et al.	University of Arizona, Tuscon, AZ	NHLBI; University of AZ; AZ Lung Association.	
9/84-9/89	Intervention Program to Reduce Passive Smoking by Infants.	Loda, F.A.	University of North Carolina, Chapel Hill, NC	NHLBI	Preliminary research found high urine cotinine levels in in utero excretion and in first days of life when exposed to tobacco products.
1985-1990	Collaborative Case Control Study of Brain Tumors on Children.	Preston-Martin, S.	University of Southern California, Los Angeles, CA	University of Southern California	Identifying risk of passive smoking exposures of children.
9/67-continuing	Collection, Separation and Elucidation of the Components of Cigarette Smoke and Cigarette Smoke Condensate.	Jenkins, R.A., Guerin, M.R.	Oak Ridge National Laboratory, Oak Ridge, TN	NCI	Identifying cigarette smoke compounds. Plans to develop methods to characterize ambient tobacco smoke.

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<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
1972- continuing	Effects of Passive Smoking on Ischemic Heart Disease Mortality of Nonsmokers: A Prospective Study.	Garland, C., Barrtee-Connor, E., Suarez, L., et al.	University of California, San Diego, San Diego, CA	University of CA, San Diego; NIADDKD; , NHLBI	Nonsmoking womens' morbidity and mor- tality tracked from '72-'74. Data used in a "cox regression," life-table analysis. Analysis to be repeated as cohort ages. Results submitted for publication.
5/74- continuing	Northwestern Pennsylvania Study on Smoking and Health.	Miller, G.H.	Studies on Smoking, Edinboro, PA	not cited	Examining effects of smoking and deter- mining disease patterns. Found: "smoking of pipes and cigars does not appear to have any effect on longevity."
1976- continuing	Risk Assessment of Passive Smoking.	Repace, J.L., Lowrey, A.H.	US EPA Washington, DC	EPA	Future plans: "a comprehensive review and measurement of sidestream smoke for epidemiologic purposes."

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<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
10/76- continuing	Male-Female Longevity Comparisons Among the Amish.	Miller, G.H.	Studies on Smoking, Edinboro, PA	not cited	Researcher believes low rate of Amish lung cancer rate may be due to smoke-free environment.
1/79- continuing	Are Low-Yield Cigarettes Less Hazardous?	Friedman, G.D., Petitti, D.B., Sidney, S.	Kaiser Foundation Research Institute, Oakland, CA	NCI	Study to last until / 1989. Analyzing ques- tionnaire data for smoking and adverse health risks correl- ations. Subjects' self-reporting verified by urine cotinine analysis.
5/79- continuing	Detection of Benzo(a)pyrene Diol Epoxide Adducts in Peripheral Blood Lymphocytes and Antibodies to the Adducts in Sera From Individuals With High Cancer Risk Exposure.	Harris, C.C., Vahakangas, K., Newman, M.J., et al.	National Cancer Institute, Bethesda, MD	NCI	Exposed and unexposed smokers and non- smokers blood tested to determine risk of lung cancer from major carcinogens and occupa- tional environments.
6/84- continuing	Effect of the Alteration of Trace Elements in Tobacco on the Chemical Composition of the Resulting Smoke.	Maier, R.H., Pories, W.J.	East Carolina University, Greenville, NC	East Carolina School of Medicine	

<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
7/84- continuing	Particle Size Analysis of Cigarette Smoke Particulates.	Hiller, F.C., Anderson, P.J.	University of Arkansas for Medical Sciences, Little Rock, AR	NIH; EPA; ALA	Future work will be done on particle deposition in humans.
1/85- continuing	Cancer Risk in Persons Living With Smokers.	Sandler, D.P., Comstock, G.W., Helsing, K.J.	National Institute of Environmental Health Sciences, Research Triangle Park, NC; Johns Hopkins University, Baltimore, MD	NIEHS	Follow-up study using data obtained in 1963 from cohort of 60,000 re household smoking. "Existing records" used to determine cancer and death rates.
undated	Relationship of Parental Smoking and Gas Cooking to Respiratory Disease in Children.	Ekwo, E.E., Weinberger, M.M., Lachenbruch, P.A., et al.	University of Iowa, Iowa City, IA	Clinical Research Center; NIH; Cystic Fibrosis Foundation; Johnson County Lung Association	published?
undated	Cigarette Design for Minimizing Escaping of Cigarette Smoke.	Chun, N.	Dubuque Emphysema and Bronchitis Foundation, Dubuque, IA	not cited	
undated	The Toxicology of Cigarette Smoke.	Pryor, W.A., Church, D.F.	Louisiana State University, Baton Rouge, LA	NIH	Determining "whether radicals in gas phase smoke are responsible for ... toxicological effects of smoking."

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<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
undated	Prevalance Survey of Respiratory Disease in New Mexico Hispanics.	Samet, J.M.	University of New Mexico, Albuquerque, NM	NHLBI	Adults and children to use questionnaire to determine household exposures. Smoking history obtained; Salivary cotinine tested.
undated	Lung Cancer Etiology in Hispanics and Anglos.	Samet, J.M.	University of New Mexico, Cancer Research and Treatment Center, Albuquerque, NM	NCI	Cigarette smoking and passive exposures as risk factors examined.
undated [as of 1985, in prelim- inary phase]	Epidemiologic Study of Lung Cancer in Nonsmokers.	Janerich, D.T., Montes, M.	Veterans Administration Medical Center, Buffalo, NY	VA	Examining passive smoking, occupation and other risk factors nonsmokers' lung cancer.
undated	Symptoms of Chronic Obstructive Pulmonary Disease Associated With Exposure to Second-hand Cigarette Smoke.	Magie, A.R., Abbey, D.E., Euler, G.L., et al.	Loma Linda University, Loma Linda, CA	not cited	
undated [study underway in 1986]	The Relationship Between Passive Smoking and Lung Cancer.	Auerbach, O.	Veterans Administration, East Orange, NJ	VA	Medical records of nonsmokers who died from lung cancer to be reviewed and compared with control group and demographic data.

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ETS-RELATED STUDIES*

— International —

<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
1981-1982	Lung Function & Environmental Conditions for School Children.	Schindl, R. Aigner, K., Wurtz, J., et al.	Elisabethinen Hospital, Linz, Austria	Austrian Government; Chemie-Linz-AG	Study to continue with analysis of passive smoking.
1/81-12/83	Immunogenicity of Tobacco Smoke in Human Subjects.	Hersey, P.	Sydney Hospital, Sydney, Australia	ATRF	
1978-1984	Lung Cancer and Passive Smoking.	Trichopoulos, D., Kalandidi, A., MacMahon, B.	University of Athens, Greece	NCI [US]; Greek Ministry of Social Sciences	NRC relied on findings.
4/81-6/84	The Distribution of Cigarette Smoke Components Between Mainstream and Sidestream Smoke.	Sakuma, H., Kusama, M., Sugawara, S.	Japan Tobacco & Salt Public Corp., Central Research Institute, Yokohama, Japan	not cited, may be JTSPC	Study employed Cambridge pads, chromatography, alkali and base traps to determine ratios.

* Studies are presented in chronological order, by project end-date.

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<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
4/84-9/84	Protein Concentrations in Mixed Saliva of Children From Families of Nonsmokers and Smokers.	Bartelik, S.	Provincial Blood Donation Centre, Kielce, Poland	Provincial Blood Donation Centre	Saliva proteins of 13 yr. old children from smoking families were lower than those from non-smoking; "differences more pronounced in boys."
1984	Health and Comfort in Nine Office Buildings.	Sterling, T.D., Sterling, E.M.	Simon Fraser University, Barnaby, British Columbia	not cited	published? Used questionnaire to assess complaints under various smoking policies. "No objective evidence" found differences among complaints in buildings with or without smoking restrictions.
1984	Studies on Indoor Air Pollution.	Sterling, T.D., Sterling, E.M.	Simon Fraser University, Barnaby, British Columbia		published? Studied pollutant levels and health complaints in 111 buildings; "regardless of smoking restrictions, no significant difference" in CO and particulates found.

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<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
4/80-3/85	Indoor Air Pollution With Tobacco Smoke.	Ishizu, Y., Matsuo, T.	Japan Tobacco & Salt Public Corp., Central Research Institute, Yokohama, Japan	JTSPC	Air flow patterns studied; offers recommendations for ventilation. Future study planned on reducing smoke odor indoors.
4/81-3/85	The Study of the Epidemiology of Lung Cancer in Women.	Miller, A.B., Jain, M.	National Cancer Institute of Canada, University of Toronto, Toronto, Canada	NCI of Canada	Assessing alleged factors of lung cancer, including smoking, passive smoking and occupational exposures.
4/81-3/85	Chromatographic Determination of Alkylamines and Alkylthiols in Gas Samples.	Kuwata, K., Nishikawa, Y., Akiyama, E.	Environmental Pollution Control Center, Osaka City, Japan	EPCC	Developing methods to determine trace compounds, including tobacco smoke, in polluted air.
4/82-3/85	Chromatogenic Determination of Aldehydes in Polluted Air or Gas Sample.	Kuwata, K., Uebori, M., Tanaka, S.	Environmental Pollution Control Center, Osaka City Japan	EPCC	Developing "simple methods" to determine presence of trace compounds, i.e., tobacco smoke.

<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
12/84-3/85	Impact of a New Smoking Policy on Office Air Quality.	Kirkbride, J., Lee, H.K., McKenna, T.A., et al.	Canadian Department of National Health & Welfare, Ottawa, Canada	HWC	Respirable suspended particulates deemed "appropriate and practical tool" to assess IAQ.
1/84-4/85	Nitrosamines and Tobacco Smoke. Toxicologicas,	Castro, J.A., Diaz Gomez, M.I. Council for	Centro de Investigaciones Buenos Aires, Argentina	CdIT; National Research, Argentina	Tested risks of nitrosamines; risks for breast-fed infants of smoking mothers suggested.
7/82- 6/85	Passive Smoking and Lung Cancer..	Pershagen, G., Hrubec, Z., Svensson, C.	National Institute of Environmental Medicine, Stockholm, Sweden	Swedish Cancer Society	Study of lung cancer in women living with smoking husbands. Data collected over 20 years; study assessing mortality via questionnaires.
10/83-6/85	The Effects of Involuntary Smoking on Asthmatic Children.	Murray, A.B., Morrison, B.J.	Childrens Hospital, Vancouver, British Columbia, Canada	British Columbia Lung Association	Study links smoke in the home and asthma in children. Passive smoking and infection to be studied further.

<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
7/84-7/85	A Randomized Controlled Trial of a Health Education Program to Reduce Passive Smoking in Infancy.	Woodward, A.	University of Adelaide, Adelaide, Australia	South Australian Health Commission	Education program did not significantly effect parental smoking.
10/82-9/85	Pulmonary Function Responses to "Passive Smoking" and the Influence of Suggestibility.	Urch, B., Shepard, R.J., Silverman, F., et al.	University of Toronto, HWC Toronto Gage Institute; School of Physical and Health Education, Toronto		Asthmatic and nonasthmatic non-smokers' pulmonary function tested. Irritation increases with moderate to heavy smoke exposure, "but... no significant dose-response relationship" identified.
1/83-12/85	Passive Smoking and Chronic Obstructive Lung Disease.	Kalandidi, A, Tzannes, S., Trichopoulos, D.	University of Athens, Greece	University of Athens; Greek Ministry of Health; Greek Cancer Society	"Suggested association" between passive smoking and lung disease.
1/85-12/85	Role of Passive Smoking in the Genesis of Chronic Respiratory Disease in Women.	Malik, S.K., Gilhotra, R.S.	Postgraduate Institute of Medical Education and Research, Chandigarh, India	PIME&R	Urban dwellers surveyed for respiratory history. Urin-analysis for nicotine to be conducted.

<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
6/82-1985	Quantification of Passive Exposure to Smoking in Children.	Gillies, P.A., Pearson, J.C.G.	University of Nottingham, Nottingham, England	Health Education Council, London	High CO levels found children's expired air when parent smokes; higher still when both parents smoke.
1983-1985	Lung Cancer in Chinese Women on Hong Kong - A Case Control Study of Some Possible Causal Factors of Lung Cancer in Nonsmoking Women.	Lam, T., Kleevans, J.W.L., Chan, W.C., et al.	University of Hong Kong	University of Hong Kong	Study objective is to "establish relationship between passive smoking and histology types."
1/82-1/86	Exposure to Carbon Monoxide - Closed Areas and Professional Factors.	Freitas, J.P.	Faculty of Medicine of Lisbon, Portugal	INIC (Mbl2)	Study of tobacco smoke CO; "significant increase of carboxyhemoglobin" found in nonsmokers.
4/84-3/86	A Study of the Characteristics and Etiology of Lung Cancer in Chinese Females in Hong Kong.	Ho, J.H.C., Tsuchiya, E., Tominaga, S., et al.	Cancer Research Institute, Tokyo; Queen Elizabeth Hospital, Hong Kong	Japanese Ministry of Education and Culture	Identifying risk factors of non-smoking women and confirming risk factors previously identified.

<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
1/84-6/86	Case-Controlled Study of the Possible Causes of the Differences in Lung Cancer Incidence Rates in Towns in Israel.	Tamir, A., Epstein, L.	Carmel Hospital, Haifa, Israel	Carmel Hospital; Israel Cancer Society; Sapir Foundation	Passive smoking exposure, smoking and occupational exposures tested. Preliminary data confirms differences in baseline (1960 and 1973) lung cancer rates.
7/84-7/86	Studies on Chronic Airflow Limitation.	Zamel, N.	University of Toronto, Mount Sinai Hospital	MRC, Canada	Comparison of smokers' and non-smokers' airway response to methacholine aerosol inhalation.
10/84-9/86	Metabolism of Mutagens/Carcinogens Present in Cigarette Smoke: Enzymatic Induction Activation and Detoxification.	Scassellati Sforzolini, G., Savino, A., Monarca, S., et al.	University of Perugia, Italy	Italian National Research Council	Mainstream and sidestream smoke condensates tested; AHH and DMND activity in smokers' and non-smokers' lungs determined.
1/80-12/86	Biological Monitoring of Active and Passive Exposure to Tobacco Smoke.	Sorsa, M., Husgafvel-Pursiainen, K., Einisto, P., et al.	Institute of Occupational Health, Helsinki, Finland	National Board of Health, Finland	Plasma thiocyanates not effective measure for short term exposure. Urine mutagenicity higher in passive smokers than nonsmokers.

<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
6/80-12/86	Cultural, Environmental and Familial Backgrounds of Female Lung Cancer Patients in Hong Kong: A Retrospective Case-Control Study.	Koo, L.C., Ho, J.H.C.	University of Hong Kong	University of Hong Kong; Hong Kong Anti-Cancer Society	Risk factors identified; "passive smoking was not related to increased risk of lung cancer among non-smokers."
1/81-12/86	Mutagenicity of Cigarette Smoke Condensates (CSCs) and Environmental Tobacco Smoke Samples.	Sorsa, M., Husgafvel-Prusiainen, K., Salomaa, S., et al.	Institute of Occupational Health, Helsinki, Finland	National Board of Health, Finland	"Preliminary data show that environmental tobacco smoke (particulate phase, collected on filters) is highly mutagenic."
4/83-12/86	Community Lung Function. The Effects of Passive Smoking on Lung Function.	Dunn, A.G., Dunn, P.A.	Puffability People, Inc., Wembley Downs, Australia	State Smoking and Health Project, Western Australia	Early findings indicate reduced lung function in passive smokers.
4/84-3/87	Physico-Chemical Studies on the Control of Indoor Air Quality.	Matsushita, H.	National Institute of Public Health, Tokyo, Japan	JTSPC	Method developed to test nitrosamines. Sidestream smoke found to be important nitrosamine source. Working to eliminate indoor air pollution.

<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
1/85-12/87	Passive Smoking, Air Pollution and Diet in the Etiology of Lung Cancer.	Trichopoulos, D., MacMahon, B., Kalandidi, A.	University of Athens, Greece; Harvard School of Public Health, Boston, MA	Greek Minis- try of Health; Greek Cancer Society	Studying lung cancer in non- smoking women.
1985-1987	An International Study of Cotinine Levels in Nonsmokers.	Preston-Martin, S., Sarraci, R., O'Neill, I.	International Agency for Research on Cancer, Lyon, France	IARC	Relating cotinine levels to home and workplace exposures.
4/72-1995	Epidemiological Study of Long-Term Effects on Health of Air Pollution in Children.	Rudnik, J., Herman, S.M., Pisiewicz, K., et al.	National Research Institute for Mother and Child, Rabka, Poland	not cited	Studying the effect of pas- sive smoking on the development of the respira- tory system.
1/60- continuing	Physiological and Hygienic Studies on Smoking Tobacco in Man and Animals.	Asano, M., Ohkubo, C.	Institute of Public Health, Tokyo, Japan	IPH; JTSPC	Cardiovascular, microvascular, pulmonary responses to active and passive smoking being tested.

<u>Dates</u>	<u>Title</u>	<u>Investigator(s)</u>	<u>Institution</u>	<u>Funding</u>	<u>Comments</u>
3/80- continuing	Health Effects of Exposure to Environmental Tobacco Smoke in the West of Scotland.	Gillis, C.R., Hole, D.J., Hawthorne, V.M.	West Scotland Cancer Surveillance Unit, Ruchill Hospital, Glasgow, Scotland	WSCSU	Preliminary results suggest higher mortality rate among those exposed to ETS. Future plans to develop method to quantify ETS exposure.
4/81- continuing	Effects of Active and Passive Smoking on Urine Cotinine Excretion in Smokers and Nonsmokers.	Matsukura, S.	Kyoto University, Kyoto, Japan	JTSPC; Ministry of Education, Culture and Science, Japan	Urinary cotinine increases with exposure to smoke. Study to test cotinine in infants and work- place subjects.
undated	Passive Smoking and the Level of Cotinine in Urine Samples in Nonsmoking Women.	Zatonski, W.	M. Sklodowska-Curie Institute of Oncology, Warsaw, Poland	not cited	No additional information.